ATTACHMENT F

CLOSURE PLAN FOR TECHNICAL AREA 54
CONTAINER STORAGE UNITS

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LIST OF ABBREVIATIONS/ACRONYMS

20.4.1 NMAC	New Mexico Administrative Code, Title 20, Chapter 4, Part 1
ASTM	American Society for Testing and Materials
COPC	contaminant of potential concern
CSU	container storage unit
DOE/NNSA	U.S. Department of Energy, National Nuclear Security Administration
D&D	decontamination and decommissioning
EPA	U.S. Environmental Protection Agency
ER	environmental restoration
LANL	Los Alamos National Laboratory
LASO	Los Alamos Site Office
m^3	cubic meters
MLLW	mixed low-level waste
MSDS	Material Safety Data Sheet
MTRUW	mixed transuranic waste
NMED	New Mexico Environment Department
PPE	personal protective equipment
QA/QC	quality control/quality assurance
RCRA	Resource Conservation and Recovery Act
SAP	sampling and analysis plan
SW-846	"Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"
SWRC	Solid Waste Regulatory Compliance Group
TA	technical area

ATTACHMENT F
CLOSURE PLAN FOR TECHNICAL AREA 54
CONTAINER STORAGE UNITS

The information provided in this closure plan addresses the applicable closure requirements specified in the New Mexico Administrative Code, Title 20, Chapter 4, Part 1 (20.4.1 NMAC) § 270.14(b)(13), revised June 14, 2000 [6-14-00], and 20.4.1 NMAC, Subpart V, Part 264, Subparts G, H, and I [6-14-00]. This closure plan describes the activities necessary to close the container storage units (CSU) at Los Alamos National Laboratory (LANL) Technical Area (TA) 54.

Closure of the TA-54 CSUs will involve removal or decontamination of hazardous wastes and hazardous waste residues after the active storage period for the CSUs. Closure activities will include removal of any remaining waste, decontamination or removal of contaminated equipment and the unit structure, and verification that all residues have been removed. In the event that closure by removal and decontamination for a CSU cannot be met, the closure plan will be modified to include alternative decontamination demonstrations or alternative closure requirements, as necessary. Closure activities will minimize the need for further maintenance, preclude the release of hazardous waste or hazardous constituents to environmental media, and be protective of human health.

This closure plan will be used to provide guidance and permit conditions for the partial closure of all the CSUs at TA-54, which include the CSUs at Area L, Area G, and TA-54 West. There are several types of CSUs at TA-54 that meet various storage requirements, both by waste type and different waste management programs. Closure of the TA-54 CSUs will occur separately and over the active life of the TA-54 facility, which is not anticipated to end before 2050. There is a high potential that decontamination procedures, analytical verification procedures, and the environmental characterization of TA-54 will change and improve over the active life of the facility. Therefore, this closure plan describes the general closure activities for the different types of storage structures at TA-54 and establishes the procedure of submitting a separate detailed TA-54 CSU-specific sampling and analysis plan (SAP) to the New Mexico Environment Department (NMED) for approval at the time of closure for each CSU. The SAP will provide the required level of detail to assure that closure performance standards are met, consistent with the appropriate decontamination and verification requirements existing at the time of closure.

This plan is organized as follows:

- General closure information (Section F.1)
- Description of the TA-54 CSUs (Section F.2)
- Closure procedures for the TA-54 CSUs (Section F.3)
- Sampling and analysis plan (Section F.4)

Until closure is complete and certified in accordance with 20.4.1 NMAC § 264.115 [6-14-00], as discussed in Section F.1.6, a copy of the approved closure plan and any approved revisions will be on file at LANL's Solid Waste Regulatory Compliance Group (SWRC) and at the U.S. Department of Energy National Nuclear Security Administration (DOE/NNSA) Los Alamos Site Office (LASO).

F.1 GENERAL CLOSURE INFORMATION

This section is prepared in accordance with the requirements of 20.4.1 NMAC § 270.14(b)(13) and 20.4.1 NMAC, Subpart V, Part 264, Subparts G, H, and I [6-14-00], as applicable.

F.1.1 Closure Performance Standard [20.4.1 NMAC § 264.111]

The TA-54 CSUs will be closed to meet the following performance standards:

- Minimize the need for further maintenance
- Control, minimize, or eliminate, to the extent necessary to protect human health and the environment, the post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground or surface waters or atmosphere
- Comply with the applicable closure and post-closure requirements of 20.4.1 NMAC, Subpart V, Part 264, Subparts G and I [6-14-00].

F.1.2 Partial and Final Closure Activities [20.4.1 NMAC § 264.112(d)]

Partial Resource Conservation and Recovery Act (RCRA) closure is the closure of a hazardous waste management unit at a facility that contains other active hazardous waste management units. Partial closure at TA-54 will consist of closing one or more of the TA-54 CSUs, while leaving the other units at LANL in operation. Partial closure (hereinafter simply referred to as closure) will be deemed complete when the waste has been removed from the CSU; the CSU and related equipment, structures, and areas have been decontaminated, if necessary; closure by removal and/or decontamination of hazardous waste and hazardous waste residues has been verified; the closure certification has been submitted to the NMED; and the NMED has approved the closure.

Final RCRA closure of the LANL hazardous waste management facility will occur when all of LANL's hazardous/mixed waste management units are closed. Final closure will consist of assembling documentation on the closure status of each waste management unit, including all previous closures as well as land-based units where closures have been or are being addressed via alternative closure requirements. Final closure will be deemed complete when the closure certification has been submitted to the NMED, and the NMED has approved the final closure.

F.1.3 General Closure Schedule [20.4.1 NMAC §§ 264.112(b)(6), 264.112(e), and 264.113]

Closure of the TA-54 facility is anticipated to occur in the year 2050; however, closure of any TA-54 CSU may occur at any time before then. Written notification will be provided 45 days before the start of closure activities for each TA-54 CSU. However, pursuant to 20.4.1 NMAC § 264.112(e) [6-14-00], removing hazardous wastes and decontaminating or dismantling equipment in accordance with an approved closure plan may be conducted at any time before or after notification of closure. Closure activities will begin according to the requirements of 20.4.1 NMAC § 264.112(d)(2) [6-14-00]. Treatment, removal, or disposal of hazardous wastes will begin in accordance with the approved closure plan, as required by 20.4.1 NMAC § 264.113(a) [6-14-00], within 90 days after final receipt of waste at the hazardous or mixed waste management unit. This timeframe will be met as long as facilities are available for treatment or disposal of these wastes. In the event that closure activities cannot begin at a unit within 90 days, LANL will notify the Secretary of the NMED in accordance with the extension requirements in 20.4.1 NMAC § 264.113(a) [6-14-00]. Closure activities will be completed in accordance with the requirements of 20.4.1 NMAC § 264.113(b) [6-14-00]. Closure will be conducted in accordance with the general schedule presented in Table F-1. Further details regarding the schedule of closure activities on a CSU-specific basis will be included with the TA-54 CSU-specific closure SAP discussed in Section F.4 of this plan. In the event that closure of a CSU is prevented from proceeding according to schedule, LANL will notify the Secretary of the NMED in accordance with extension request requirements in 20.4.1 NMAC § 264.113(b) [6-14-00]. In addition, the demonstrations in 20.4.1 NMAC § 264.113(a)(1) and (b)(1) [6-14-00] will be made in accordance with 20.4.1 NMAC § 264.113(c) [6-14-00].

F.1.4 Amendment of the Closure Plan [20.4.1 NMAC § 264.112(c)]

In accordance with 20.4.1 NMAC § 264.112(c) [6-14-00], LANL will submit a written notification of or request for a permit modification to authorize a change in the approved closure plan whenever:

- There are changes in operating plans or facility design that affect the approved closure plan
- There is a change in the expected year of closure
- Unexpected events occur during closure that require modification of the approved closure plan
- The owner or operator requests the Secretary of the NMED to apply alternative requirements to a regulated unit under 20.4.1 NMAC §§ 264.90(f) and/or 264.110(c).

The written notification or request will include a copy of the amended closure plan for approval by the NMED.

LANL will submit a written request for a permit modification with a copy of the amended closure plan at least 60 days prior to the proposed change in unit design or operation or no later than 60 days after an occurrence of an unexpected event that affects the closure plan. If the unexpected event occurs during closure, the permit modification will be requested within 30 days of the occurrence. The Secretary of the NMED may request a modification of the closure plan under the conditions presented in the bulleted items above. LANL will submit the modified plan in accordance with the request within 60 days of notification, or within 30 days of notification if a change in facility condition occurs during the closure process.

F.1.5 Closure Cost Estimate, Financial Assurance, and Liability Requirements [20.4.1 NMAC § 264.140(c)]

In accordance with 20.4.1 NMAC § 264.140(c) [6-14-00], LANL, as a federal facility, is exempt from the requirements of 20.4.1 NMAC, Subpart V, Part 264, Subpart H [6-14-00], to provide a cost estimate, financial assurance mechanisms, and liability insurance for closure actions.

F.1.6 Closure Certification [20.4.1 NMAC § 264.115]

Within 60 days after completion of closure of each CSU at TA-54 or final closure of the facility, LANL will submit to the Secretary of the NMED, via certified mail, a certification that the unit or facility has been closed in accordance with the approved closure plan. The certification will be signed by the appropriate DOE/NNSA and LANL officials and by an independent, registered professional engineer, in accordance with 20.4.1 NMAC § 264.115 [6-14-00]. Documentation supporting the independent, registered engineer's certification will be furnished to the Secretary of the NMED upon request, as specified in 20.4.1 NMAC § 264.115 [6-14-00]. A copy of the

certification and supporting documentation will be maintained by both DOE/NNSA LASO and SWRC.

F.1.7 Security

Because of the ongoing nature of waste management operations at TA-54, security and administrative controls for the TA-54 CSUs will be maintained by the DOE/NNSA or another authorized federal agency for as long as necessary to prohibit public access. The security fence at the TA-54 boundary will be maintained to ensure that public access into TA-54 is prevented.

F.1.8 Closure Reports

Upon completion of RCRA closure activities at a TA-54 CSU, a closure report will be prepared and provided to the Secretary of the NMED. The report will document closure and contain, for example, the following:

- A copy of the certification described in Section F.1.6
- A general summary of closure activities
- Any significant variance from the approved closure plan and the reason for the variance
- A summary of any sampling data associated with the closure
- The location of the file of supporting documentation (e.g., memos, logbooks, laboratory sample analysis data)
- Storage or disposal location of hazardous/mixed waste resulting from closure activities
- A certification of accuracy of the report.

F.1.9 Survey Plat and Post-Closure Requirements [20.4.1 NMAC §§ 264.116 and 264.117 through 264.120]

For closure, LANL intends to remove hazardous waste and associated constituents from the CSU undergoing closure, remove or treat soil contaminated with hazardous wastes or hazardous waste residues resulting from storage operations, and remove or decontaminate structures and equipment contained in the unit. If decontamination to the cleanup levels approved in the CSU-specific closure SAP cannot be achieved, LANL intends to dispose of or otherwise manage the contaminated structures, equipment, soil, or other media. If decontamination to these cleanup levels is not

achievable, LANL may propose an alternate demonstration of decontamination, as circumstances indicate.

If a CSU cannot be closed as described above, LANL will conduct post-closure or equivalent activities in accordance with Appendix G in the most recent version of the "Los Alamos National Laboratory General Part B Permit Application," hereinafter referred to as the LANL General Part B. A survey plat prepared in accordance with 20.4.1 NMAC § 264.116 [6-14-00] will be filed with the appropriate authorities at certification of closure, as described in that regulation. A survey plat indicating the location and dimensions of the CSU with respect to permanently surveyed benchmarks will be submitted to the local zoning authority (i.e., Los Alamos County) and to the NMED at the time of submission of the certification of closure. The plat filed with the local zoning authority will contain a prominently displayed note, which states the obligation of LANL and DOE/NNSA to restrict disturbance of the unit in accordance with the applicable regulations in 20.4.1 NMAC, Subpart V, Part 264, Subpart G. Post-closure notices will be filed with appropriate authorities, as described in 20.4.1 NMAC § 264.119 [6-14-00]. To meet that requirement, DOE/NNSA will file a "Land Use Restriction Notice" or equivalent document with the County of Los Alamos and other authorized agencies. Within 60 days after completion of the established post-closure care period for the unit, LANL will submit to the Secretary of the NMED, via certified mail, a certification of completion of post-closure care in accordance with the requirements of 20.4.1 NMAC § 264.120 [6-14-00].

F.2 DESCRIPTION OF THE TA-54 CSUs

This section provides a general description of TA-54 and the TA-54 CSUs. LANL does not currently intend to reduce the areal extent or the design capacities of the CSUs at TA-54 during the active life of those units. Estimated annual quantities for the CSUs at TA-54 are provided in the most recent version of the "Los Alamos National Laboratory General Part A Permit Application," hereinafter referred to as the LANL General Part A.

TA-54 is located on top of Mesita del Buey, an east-west trending mesa that is bordered on the north by Cañada del Buey and on the south by Pajarito Canyon. The elevation at TA-54 is approximately 6,800 feet. TA-54 is used primarily for waste management. It includes four material disposal areas, one each at Areas G, H, J, and L. It also includes hazardous/mixed waste storage areas and numerous supporting offices. The Radioassay and Nondestructive Testing Facility (TA-54-38) is located in the western part of TA-54 (TA-54 West).

The TA-54 CSUs are located at Area L, Area G, and TA-54 West. There are two CSUs at Area L, nine CSUs at Area G, and two CSUs at TA-54 West, as indicated below.

The two Area L CSUs are the aboveground CSU within the fence and the Storage Shafts CSU (Shafts 36 and 37).

The nine Area G CSUs are:

- Storage Domes 229, 230, 231, and 232, and Pad 9;
- TA-54-412, Storage Dome 226, and Pad 1;
- Storage Dome 48 and Pad 3;
- Pad 10 (former Pads 2 and 4) and the transuranic waste characterization facilities;
- Storage Domes 49 and 224; Storage Sheds 144, 145, 146, 177, 1027, 1028, 1030, and 1041; and Pads 5, 8, and 7;
- Storage Domes 153 and 283 and Pad 6;
- Storage Shed 8;
- TA-54-33, and;
- Storage Dome 375 and Pad 11.

The two TA-54 West CSUs are the Indoor CSU at TA-54-38 and the Outdoor CSU at and adjacent to TA-54-38.

F.2.1 Estimate of Maximum Waste in Storage

The maximum total capacity of hazardous and mixed waste potentially in storage at any time at the aboveground CSU within the fence at Area L is 407,880 gallons. The maximum total capacity of mixed waste potentially in storage at any time in the Storage Shafts CSU at Area L is 600 gallons. The estimate of the total maximum inventory of hazardous and mixed waste stored in Area L over the active life (1980 to 2003) is 23,150 cubic meters (m^3). The maximum total inventory of hazardous waste potentially disposed of in the regulated unit at Area L is 42,050 cubic feet.

The maximum total capacity of hazardous and mixed waste potentially in storage at any time at the Area G CSUs is 4,506,590 gallons, as shown below:

- Storage Domes 229, 230, 231, and 232 and Pad 9 = 1,446,720 gallons;
- TA-54-412, Storage Dome 226, and Pad 1 = 502,920 gallons;
- Storage Dome 48 and Pad 3 = 213,840 gallons;
- Pad 10 (former Pads 2 and 4) and the transuranic waste characterization facilities = 319,770 gallons;

- Storage Domes 49 and 224; Storage Sheds 144, 145, 146, 177, 1027, 1028, 1030, and 1041; and Pads 5, 8, and 7 = 623,480 gallons;
- Storage Domes 153 and 283 and Pad 6 = 597,300 gallons;
- Storage Shed 8 = 11,880 gallons;
- TA-54-33 = 108,240 gallons, and;
- Storage Dome 375 and Pad 11 = 682,440 gallons.

The estimate of the total maximum inventory of mixed waste stored in Area G over the active life (1990 to 2003) is 6,691 m^3. The maximum total inventory of hazardous waste disposed of in the two regulated units at Area G is 8.1 m^3.

The maximum total capacity of mixed waste potentially in storage at any time at the Indoor CSU at TA-54 West is 3,080 gallons. The maximum total capacity of mixed waste potentially in storage at any time at the Outdoor CSU at TA-54 West is 8,580 gallons. The maximum total inventory of mixed waste stored on site over the active life of TA-54 West (1995 to 2003) is estimated to be 137,500 gallons.

F.2.2 Description of Stored Waste

The TA-54 CSUs are used for storage of hazardous waste, mixed low-level waste (MLLW), and mixed transuranic waste (MTRUW). The hazardous waste stored in the TA-54 CSUs was generated from research and development activities, general facility operations, decontamination and decommissioning (D&D) operations, and environmental restoration (ER) activities throughout LANL. Mixed waste is any solid waste that has both a hazardous waste component (as defined by 20.4.1 NMAC, Subpart II, Part 261) and a radioactive waste component (as defined by DOE Order 435.1, “Radioactive Waste Management” [DOE, 1999]). The MLLW stored in the TA-54 CSUs was generated during research and development activities, radioactive material processing and recovery operations, general facility operations, D&D operations, and ER activities at various TAs throughout LANL. The MTRUW stored in the TA-54 CSUs was generated during research activities, radioactive material processing and recovery operations, D&D operations, and ER activities at various TAs throughout LANL. Information on the hazardous component(s) of all wastes that can be stored at the TA-54 CSUs is provided in the LANL General Part A. Additional information on waste-generating activities at LANL is available in the waste analysis plan in Appendix B of the LANL General Part B.

F.3 CLOSURE PROCEDURES FOR THE TA-54 CSUs

Closure activities at the TA-54 CSUs will involve the removal of hazardous wastes and/or residues, decontamination or removal of the storage structures and associated waste management equipment with subsequent appropriate disposition, and verification of decontamination.

F.3.1 Removal of Waste

Prior to the initiation of closure activities, wastes will be removed from the TA-54 CSU to be closed. Containers will be removed from each CSU primarily with forklifts and/or cranes. Small containers may be handled manually or with a dolly. Containers will be placed onto closed bed trucks, flatbed trucks, forklifts, or trailers for transport. Appropriate shipping papers will accompany the wastes during transport. RCRA-regulated waste containers will be moved to an approved on-site CSU or to an off-site permitted treatment, storage, or disposal facility.

F.3.2 Closure Procedure and Decontamination

To the extent possible, all contaminated structures and equipment at the TA-54 CSU to be closed will be decontaminated. Structures and equipment that cannot or will not be decontaminated will be removed, containerized, and managed in compliance with appropriate waste management regulations. Decontamination will be verified by sampling and analysis. All sampling conducted during closure activities will be done as generally discussed in Section F.3.4 and as included in the CSU-specific SAP (see Section F.4). Sampling and analysis will be done in accordance with appropriate quality assurance/quality control (QA/QC) procedures as required by the individual analytical technique or the authority for the relevant standard methods (e.g., "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" [*SW-846*]; American Society for Testing and Materials [ASTM]). Closure will be conducted in accordance with the general schedule presented in Table F-1, as amended by TA-54 CSU-specific SAPs submitted prior to the actual closures.

F.3.3 Preliminary Closure Activities

F.3.3.1 Safety Precautions

Job hazards associated with closure activities will be identified, controls developed, and workers briefed before closure activities are conducted, in accordance with LANL safety procedures. Personnel involved in closure activities will wear appropriate personal protective equipment (PPE), specified by the Health Physics Group and the Industrial Hygiene and Safety Group, and will follow good hygiene practices to protect themselves from exposure to hazardous and/or mixed waste. The level of PPE that will be required will depend upon the physical hazards present and the levels of radiological and/or chemical contamination that are detected, if any. All workers involved in closure activities will be required to have appropriate training (see Attachment D in this application and Appendix D in the LANL General Part B). Contaminated PPE will either be decontaminated or managed in compliance with appropriate waste management regulations.

F.3.3.2 Background Determination

Before any decontamination activity begins, background levels for potential hazardous waste constituents will be determined. Decontamination and verification sampling procedures may involve wash water sampling, swipe sampling, soil sampling, or other methods available at the time of closure. Background samples will be obtained from clean water, cleaning equipment, and detergent solutions if wash water methods are used to decontaminate TA-54 CSUs. Background samples will be obtained for the material to be decontaminated or for any sampling materials used in swipe sampling analysis used for verification purposes. Appropriate background samples and/or concentrations derived from LANL studies developed under the LANL corrective action or other programs will be used to determine hazardous constituent background/baseline levels. Details of appropriate background levels and/or necessary samples and collection techniques will be included in the TA-54 CSU-specific SAP, as discussed in Section F.4 of this closure plan.

F.3.3.3 Structural Assessment

Before decontamination activities begin, the base or secondary containment of each CSU will be inspected for any cracks or conditions that could potentially lead to loss of wash water containment if wash water procedures will be used for decontamination. Preventive maintenance inspections are conducted routinely (i.e., weekly) at each CSU. If any defects, deterioration, damage, or hazards affecting containment have developed after the most recent preventive maintenance inspection was conducted, appropriate remedial actions (including sampling, repairs, maintenance, or replacement) will be completed before decontamination activities begin. If a crack or gap is present, a swipe sample or a representative sample of the media will be taken (e.g., asphaltic concrete or concrete) to determine the presence of contamination. The sample will be analyzed for hazardous contaminants of potential concern (COPC) determined through review of the chemical properties of the waste stored during the operating history of the CSU and through an evaluation of the history of any spills that may have occurred at the CSU. If contamination is detected, the surface flaw will be decontaminated prior to repairing the crack/gap. Complete or partial removal (e.g., cold milling) of the material may be performed until contamination is no longer detected. If partial removal is successful in eliminating the contamination, it will be assumed that the remaining material, including underlying soil, is clean.

After any decontamination wash down process, the used wash water will be collected, transferred to containers, sampled, and analyzed for the appropriate parameters determined during the

documentation review. If the used wash water is nonhazardous and nonradioactive, it will be managed appropriately in accordance with LANL policy. Otherwise, the used wash water will be managed at an appropriate on-site facility.

F.3.4 Decontamination of the TA-54 CSUs

The TA-54 CSUs that may be decontaminated during closure activities are comprised of storage sheds, domes, and buildings; shafts; and asphaltic-concrete pads. The following discussion is organized by types of structures because the decontamination approach differs. These procedures are discussed generally, as specific details will be included in the SAPs to be submitted to the NMED for approval (see Section F.4 of this closure plan). If any portable equipment, structure walls, or floors cannot or will not be decontaminated, the contaminated portion will be disposed of in accordance with appropriate waste management regulations.

F.3.4.1 Decontamination of Storage Sheds, Domes, and Buildings

Decontamination of storage sheds, domes, and buildings will be initiated by washing the interior storage surfaces. The first step in decontamination will be to evaluate the CSU's operating record to determine the COPCs. The appropriate surfactant/solvent to be used in the wash water solution will be determined based upon the COPCs. General laboratory surfactants (e.g., Alconox®) will be used for the majority of washes where many COPC analytes are being sampled for, and specialized solvents may be used for more focused removal purposes.

Based on the review of the operating record (e.g., spills) and an evaluation of structural areas of potential concern (e.g., sumps, stained areas, low areas), preliminary decontamination focused on these areas may be conducted prior to the overall decontamination of the CSU. Prior to overall decontamination of a structure, any portable equipment will be wiped down with wash water solution. The structure walls and floors will then be wiped down with mops and/or sponges to minimize the amount of liquid waste generated as a result of decontamination activities. A portable berm, existing berm or sump, or other device (e.g., absorbent socks, plastic sheeting, wading pools) designed to collect and provide containment for used wash water will be used, as necessary.

After the walls and floors have been decontaminated, any recessed areas present (e.g., sumps) will be wiped down with wash water. The used wash water will collect in the recessed area; it will then be removed and transferred to an appropriate container(s). The recessed area will be wiped down again with wash water; this wash water will be minimized, collected with sponges and/or mops, and

transferred to the same appropriate container(s), where it will be sampled. The container(s) of used wash water will be stored appropriately, pending analysis for decontamination verification and waste characterization.

Used wash water samples may exhibit contamination due to leaching of storage structure walls or floors during wash down. If this is the case, record reviews (e.g., manufacturer's specifications, Material Safety Data Sheets [MSDS]) and additional analyses may be performed to determine if leaching of contaminants from the walls or floors contributed to the contaminant concentration in used wash water. If this additional evaluation confirms the structure walls or floors as the source of contamination, baseline concentrations for the clean wash water will be adjusted accordingly. If sampling and analysis indicate that hazardous constituents are present and are not attributed to leaching of contaminants from storage structure walls or floors, the wash cycles and analyses will continue until the structure or equipment has been decontaminated or the decision is made to manage it appropriately as contaminated waste. This material may be transported to and stored at other hazardous waste management locations to facilitate the closure process.

F.3.4.2 Decontamination of the Storage Shafts CSU (Shafts 36 and 37)

The Storage Shafts CSU (Shafts 36 and 37) at TA-54, Area L, contains radioactive isotope production lead stringers. Shaft 36 contains three stringers; Shaft 37 contains four stringers. Each stringer consists of two rectangular steel tubes, one partially inside the other. Each inner tube is filled with a mixture of concrete and lead shot. The outer tubes are filled with concrete only. The ends of the tubes are capped and the lower eight feet of each stringer is in a stainless-steel sheath. Each stringer assembly is also wrapped in plastic.

Because of the multiple containment barriers (i.e., concrete, steel tubes, stainless-steel sheath, and plastic wrap) between the lead and the shafts and because concrete and steel covers extend beyond the diameter of each shaft to prevent run-on into the shafts, it is anticipated that hazardous constituents will not be present in the shafts once the stringers are removed. Therefore, if the integrity of the plastic wrap and/or stainless-steel sheath surrounding the stringers appears uncompromised, sampling for hazardous constituents within the shafts will not be required. If the stainless-steel sheath appears corroded or damaged, samples will be obtained from the bottom of the shaft and analyzed for lead.

F.3.4.3 Decontamination of Asphaltic Concrete at the TA-54 CSUs

Potential closure activities of asphaltic concrete at the TA-54 CSUs include decontamination or removal. If the decision is made to decontaminate the asphaltic concrete, it will be wiped down with mops and/or sponges to minimize the amount of liquid waste generated as a result of decontamination activities. A portable berm, existing berm or sump, or other device (e.g., absorbent socks, plastic sheeting, wading pools) designed to collect and provide containment for used wash water will be used, as necessary. After the wash down process, the used wash water will be collected, sampled for analysis, and stored in appropriate containers at the site. Each asphaltic-concrete location may undergo several wash cycles; however, the option to remove the asphaltic concrete and manage it as hazardous waste may be exercised at any time after the initial wash cycle.

Used wash water samples may exhibit contamination due to leaching of the asphaltic concrete during wash down. If this is the case, record reviews (e.g., manufacturer's specifications, MSDSs) and additional analyses will be performed to determine if leaching from the asphaltic concrete contributed to the contaminant concentration in the used wash water. If this additional evaluation confirms the asphaltic concrete as the source of contamination, baseline concentrations for the clean wash water will be adjusted accordingly. Decontamination verification is discussed further in Section F.3.5.

If sampling and analysis indicate that hazardous constituents are present and are not attributed to leaching from the asphaltic concrete, the wash cycles and analyses will be repeated until the asphaltic concrete has been decontaminated or the decision is made to manage it appropriately as hazardous waste.

If the decision is made to not decontaminate the asphaltic concrete or to remove only the contaminated portions (e.g., by cold milling, see Section F.3.3.3), it will be totally or partially removed and disposed of appropriately in lieu of decontamination activities. The asphaltic concrete may be transported to and stored at other hazardous waste management locations to facilitate the closure process. If the asphaltic concrete is totally removed, soil samples will be collected from the area underlying the original asphaltic concrete. Soil sampling procedures are described in Section F.3.4.4. If removal of only the contaminated portion of the asphaltic concrete is successful, the underlying soil will be presumed to be uncontaminated and soil sampling will not be required.

F.3.4.4 Soil Sampling

In certain cases of closures at the TA-54 CSUs, soil removal may be conducted to meet the closure performance standards. Examples include detection of contamination that had migrated beyond TA-54 CSU asphaltic-concrete pads to the surrounding soil, and cases in which operating records indicate that a release of hazardous waste from storage structures to the surrounding soil has occurred. If records indicate that no release of hazardous waste to soils has occurred, soil sampling will not be conducted.

If collection of soil samples is determined to be necessary to demonstrate decontamination, appropriate background samples and/or concentrations derived from LANL studies (see Section F.3.3.2) will be used to determine background/baseline levels for decontamination verification. Sampling locations to determine the extent of contamination will be based upon a biased random sampling approach, including historical evidence of releases, physical evidence of distressed vegetation or visual staining, and any other information that indicates a potential contamination pathway. The number of samples, locations, depths, and sampling methods will be determined before closure and included in the TA-54 CSU-specific closure SAP, as discussed in Section F.4. Results from sampling will be compared to the background samples and/or baseline concentration levels included in the closure SAP. If analysis shows that the soil at the storage areas is contaminated, soil sampling results that are above the background/baseline levels will be used to identify the extent of soil contamination. Contaminated soils will either be treated in place or removed in layers and sampling conducted following removal of each layer. This procedure will be used to minimize the amount of soil removed. The removal and sampling process will be repeated until the decontamination criteria are achieved or it is decided to close the CSU as a landfill.

In the event closure of the CSU by removal and decontamination cannot be achieved, a post-closure plan will be prepared for the site as required by 20.4.1 NMAC § 264.118. The plan will include provisions to stabilize the site and will describe planned monitoring activities, maintenance activities, and the frequencies at which these activities will be performed, as required by 20.4.1 NMAC § 264.118.

F.3.4.5 Decontamination of Equipment

Prior to use, sampling personnel will ensure that all reusable and/or disposable sampling equipment to be used during decontamination in closure activities is clean. If reusable sampling equipment is used, sampling equipment rinsate blanks will be collected and analyzed in accordance with the

QA/QC procedures described in the closure SAP. Reusable decontamination equipment, including protective clothing and tools, used during closure activities will be scraped as necessary to remove any residue and cleaned with a wash water solution (the closure SAP will include a discussion of wash water solutions). Residue and disposable decontamination equipment as well as reusable decontamination equipment that cannot be decontaminated will be containerized and managed appropriately at an approved on-site facility, depending on the regulated constituents present.

F.3.5 Decontamination Verification

Sufficient sampling and analysis will be required to demonstrate that hazardous waste residue is not present at the CSU after closure. Wash water sampling, swipe sampling, or other appropriate sampling and analysis methodologies may be used to verify decontamination. The verification sampling method will be determined at the time of development of the TA-54 CSU-specific closure SAP and will be based on factors such as COPCs and materials of construction for the storage structure. The SAP will establish the minimum number of verification samples based on the total surface area of the CSU. Using a biased random sampling approach, items, structures, and/or surfaces will be sampled for verification of decontamination. Sample bias will include known or likely areas of contamination, low areas, sumps, and known spill locations, as determined to be appropriate on a case-by-case basis.

For wash water-based decontamination verifications (e.g., asphaltic-concrete pads), the samples of clean wash water solution squeezed from mops and/or sponges prior to use will be collected as background before initial wash down of any CSU, as described in Section F.3.3.2 of this closure plan. The samples will be analyzed for the appropriate parameters, as presented in the closure SAP. Analytical procedures will conform to methods found in the most current version of *SW-846* (U.S. Environmental Protection Agency [EPA], 1986). Used wash down solutions will be analyzed for the same parameters. Areas will be considered contaminated if the used wash water solution shows a significant increase (i.e., determined using statistical methods defined in *SW-846*) in the analytical parameters over those in the clean wash water solution or does not meet other decontamination criteria in Section F.3.6. If subsequent wash downs are deemed necessary, an additional sample of clean wash water solution squeezed from mops and/or sponges prior to use will be taken for each additional wash down event.

Swipe sampling may be used on a case-by-case basis (e.g., for smooth or impervious surfaces such as metal and dome fabric) to determine verification of decontamination at the TA-54 CSUs.

Background for swipe samples will be determined by submitting an unused swipe and solvent sample for analysis. Swipe samples will be analyzed using approved methods, which will be included in the closure SAP. The rationale for when swipe sampling will be conducted will also be included in the SAP.

If other sampling methodologies have been developed at the time of closure for the TA-54 CSU, their use to determine decontamination will be addressed in the closure SAP.

For any sampling methodology, decontamination will be verified if the collected samples meet any of the decontamination criteria listed in Section F.3.6 of this closure plan. If the verification sampling indicates contamination higher than the approved values, additional sampling will be performed to establish the boundaries of contamination for large structures. After establishing the boundaries of contamination, the decontamination process will be repeated within those boundaries, using portable berms or other appropriate material to limit the potential for run-off from the affected area. An additional round of verification sampling will be performed for all of the areas previously determined to be contaminated. After each decontamination event and verification iteration, a decision will be made to repeat the process or remove contaminated materials and dispose of them properly.

F.3.6 Decontamination Criteria

Successful decontamination is defined as one of the following criteria:

- No detectable hazardous waste or hazardous waste constituents from container storage activities are found in the final sample.
- Detectable hazardous waste or hazardous waste constituents from container storage activities in the final sample are removed to statistically significant levels based on baseline concentrations in the clean wash water.
- Detectable hazardous waste or hazardous waste constituents from container storage activities in the final sample are at or below levels agreed upon with the NMED.
- Detectable hazardous waste or hazardous waste constituent concentrations from container storage activities do not significantly decrease after several wash downs. In such an event, hazardous constituents that pose an acceptable risk will be allowed to remain, as mutually agreed upon with the NMED.

An alternative demonstration of decontamination may be proposed and justified at the time of unit closure, as circumstances indicate. The Secretary of the NMED will evaluate the proposed

alternative in accordance with the standards and guidance then in effect and, if approved, incorporate the alternative into this closure plan.

F.4 SAMPLING AND ANALYSIS PLAN

Sampling and analytical procedures will be performed during the decontamination and verification activities associated with the closure of the TA-54 CSUs covered by this plan. These procedures will use standard approved methods (e.g., *SW-846*, ASTM), as appropriate, for making closure decontamination verification determinations. However, the TA-54 CSUs are not anticipated to undergo closure for a relatively long time, and it is probable that sampling and analytical methods will be revised and improved before closure. In order to alleviate the need for future closure plan and permit modifications until actual closure activities are scheduled, LANL will submit TA-54 CSU-specific closure SAPs to the NMED at the time of closure notification for review and approval.

The TA-54 CSU-specific closure SAPs will contain a detailed discussion of the available CSU information and proposed closure methodology to assure the closure performance standards are met. These closure SAPs for the TA-54 CSUs will include:

- A detailed discussion of site characteristics.
- The CSU operational history, to include descriptions of known spills, releases, and/or evidence of potential problems (e.g., visual stains, dead vegetation, solid waste management units).
- Chemical properties of the waste stored at the CSU.
- Determination of applicable COPCs.
- A hazard control plan, including a review of chemical hazards present at the site, control and monitoring methods and procedures, and required PPE.
- Determination of wash water solution composition, if necessary.
- Detailed procedures for decontamination methods for equipment, structures, and media.
- Discussion of background levels determined through sampling or use of published data and their relevance to the specific CSU.
- Methods for sampling and analysis of contaminated media.
- Removal procedures for contaminated media, if necessary.

- Sampling methods for decontamination media and hazardous waste determination. The discussion should include the rationale for using wash water samples, swipe samples, soil samples, and/or other sampling methodology.

- Sampling methods for decontamination verification procedures. The discussion should include the statistical or judgmental basis for determining the number of verification samples needed and the constituents to be analyzed for.

- Sampling equipment decontamination and disposition procedures.

- Sample handling and documentation procedures.

- Analytical methods (including detection limits) and the rationale for their determination.

- Disposition of removed waste, decontamination media, or contaminated soils. This discussion should include an identification of proposed on- or off-site hazardous waste management facilities that may be used for final disposition and the types of wastes anticipated to be shipped.

- Decontamination criteria.

- Statistical basis for verification of decontamination, if applicable. The discussion should include information on determination of statistical increases in analytical parameters and numerical values for significant increases.

- Risk assessment procedures to be used, if necessary.

- Field and laboratory QA/QC procedures.

- Schedule of closure activities, including decontamination, sampling, analysis, potential removal of soils, and closure certification submittal.

- Identification of contact person or office.

F.5 REFERENCES

DOE, 1999, "Radioactive Waste Management," *DOE Order 435.1*, U.S. Department of Energy, Washington, D.C.

EPA, 1986 and all approved updates, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," *SW-846*, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, U.S. Government Printing Office, Washington, D.C.

Table F-1

General Schedule for Closure Activities at Technical Area 54 Container Storage Units (CSU)

Activity	Maximum Time Required[a]
Submit CSU-specific sampling and analysis plan (SAP)	-90 Days
Notify the New Mexico Environment Department (NMED)	-45 Days
Collect background samples (as specified in SAP)	-5 Days
Final receipt of waste	Day 0
Begin closure activities - removal of wastes	Day 5
Decontamination of structure(s) and/or equipment	Day 10
Perform verification sampling of the structure(s) and/or equipment	Day 20
Evaluate analytical data	Day 50
Perform additional decontamination (if necessary)	Day 55
Perform additional sampling (if necessary)	Day 60
Evaluate analytical data	Day 75
Perform asphaltic concrete decontamination and sampling (if necessary)	Day 80
Evaluate analytical data (if necessary)	Day 95
Perform soil sampling (if necessary)	Day 100
Evaluate analytical data	Day 120
Perform final cleanup (e.g., removal of decontaminated equipment and decontamination wastes)	Day 140
Verify decontamination	Day 150
Submit closure certification to NMED	Day 180

[a] The schedule above indicates calendar days from the beginning by which activities will be completed. Some activities may be conducted simultaneously and/or may not require the maximum time listed. Extensions to this schedule may be requested, as needed.